
CHAPTER 8.88 WATER-EFFICIENT LANDSCAPING REGULATIONS

8.88.010 Purpose.

The purpose of this Chapter is to:

- A. Reduce irrigation water consumption with no decline in the physical and visual quality of urban landscaping.
- B. Establish a sufficient but flexible structure for designing, installing and maintaining water-efficient landscapes in local projects.

8.88.020. Applicability.

- A. The requirements of this Chapter shall apply to all building or development permits issued after December 31, 1992, for:
 - 1. All new and rehabilitated landscaping for public agency projects and private development projects that require a development and/or building permit with new or rehabilitated landscapes that meet the criteria of this Section, including but not limited to industrial, commercial and recreational projects.
 - 2. Developer-installed landscaping in single-family and multi-family projects.
- B. The requirements of this Chapter do not apply to:
 - 1. Homeowner-provided landscaping at existing and new single-family and multi-family projects.
 - 2. Cemeteries.
 - 3. Registered historical sites.
 - 4. Ecological restoration projects that do not require a permanent irrigation system.
 - 5. Landscaping irrigated solely by reclaimed water and to which no potable pipeline exists for irrigation purposes.
 - 6. Any project with a landscaped area less than five thousand (5,000) square feet.

8.88.030. Definitions.

For the purposes of these regulations, certain words and phrases shall be interpreted as set forth in this Chapter unless it is apparent from the context that a different meaning is intended. Where any of the definitions in this Chapter may conflict with definitions in Chapter [8.08](#), Definitions, the definitions in this Chapter shall prevail for the purposes of this Chapter. The words used in this Chapter shall have the meaning set forth as follows:

“Anti-drain valve” or “check valve” means a valve located under a sprinkler head to hold water in the system so it minimizes drainage from the lower-elevation sprinkler heads.

“Application rate” means the depth of water applied to a given area, usually measured in inches per hour.

“Applied water” means the portion of water supplied by the irrigation system to the landscape.

“Automatic controller” means a mechanical or solid state timer, capable of operating valve stations to set the days and length of time of a water application.

“Backflow prevention device” means a safety device used to prevent pollution or contamination of the water supply due to the reverse flow of water from the irrigation system.

“Certified landscape irrigation auditor” means an individual certified by the Irrigation Association (a nationwide organization). The state of California provides training that is certified by the Irrigation Association.

“City” means the City of Dublin.

“Conversion factor (0.62)” means a number that converts the maximum applied water allowance from acre-inches per acre per year to gallons per square foot per year. The conversion factor is calculated as follows:

$(325,851 \text{ gallons} / 43,560 \text{ square feet}) /$

$12 \text{ inches} = (0.62)$

$325,851 \text{ gallons} = \text{one acre foot}$

$43,560 \text{ square feet} = \text{one acre}$

$12 \text{ inches} = \text{one foot}$

To convert gallons per year to 100-cubic-feet per year, another common billing unit for water, divide gallons per year by 748. (748 gallons = 100 cubic feet.)

“Development permit” means approval for any type of development or development project as defined in Government Code Sections 65927 and 65928.

“District” means the Dublin San Ramon Services District.

“Ecological restoration project” means a project where the site is intentionally altered to establish a defined, indigenous, historic ecosystem.

“Emitter” means drip irrigation fittings that deliver water slowly from the system to the soil.

“Established landscape” means the point at which plants in the landscape have developed roots into the soil adjacent to the root ball.

“Establishment period” means the first year after installing the plant in the landscape.

“Estimated applied water use” means the portion of the estimated total water use that is derived from applied water. The estimated applied water use shall not exceed the maximum applied water allowance. The estimated applied water use may be the sum of the water recommended through the irrigation schedule, as referenced in Section 8.88.040.B.3.

“Estimated total water use” means the annual total amount of water estimated to be needed to keep the plants in the landscaped area healthy. It is based upon such factors as the local evapotranspiration rate, the size of the landscaped area, the types of plants, and efficiency of the irrigation system as described in Section 8.88.040.B.4.

“ET adjustment factor” means a factor of 0.8, that, when applied to reference evapotranspiration, adjusts for plant factors and irrigation efficiency, two (2) major influences upon the amount of water that needs to be applied to the landscape.

A combined plant mix with a site-wide average of 0.5 is the basis of the plant factor portion of this calculation. The irrigation efficiency for purposes of the ET Adjustment Factor is 0.625. Therefore, the ET Adjustment Factor $(0.8) = (0.5/0.625)$.

“Evapotranspiration” means the quantity of water evaporated from adjacent soil surfaces and transpired by plants during a specific time.

“Flow rate” means the rate at which water flows through pipes and valves (gallons per minute or cubic feet per second).

“Hydrozone” means a portion of the landscaped area having plants with similar water needs that are served by a valve or set of valves with the same schedule. A hydrozone may be irrigated or nonirrigated. For example, a naturalized area planted with native vegetation that will not need supplemental irrigation once established is a nonirrigated hydrozone.

“Infiltration rate” means the rate of water entry into the soil expressed as a depth of water per unit of time (inches per hour).

“Irrigation efficiency” means the measurement of the amount of water beneficially used divided by the amount of water applied. Irrigation efficiency is derived from measurements and estimates of irrigation system characteristics and management practices. The minimum irrigation efficiency for purposes of this Chapter is 0.625. Greater irrigation efficiency can be expected from well-designed and maintained systems.

“Landscape irrigation audit” means a process to perform site inspections, evaluate irrigation systems, and develop efficient irrigation schedules.

“Landscaped area” means the entire parcel less the building footprint, driveways, nonirrigated portions of parking lots, hardscapes - such as decks and patios, and other nonporous areas. Water features are included in the calculation of the landscaped area. Areas dedicated to edible plants, such as orchards or vegetable gardens, are not included.

“Lateral line” means the water delivery pipeline that supplies water to the emitters or sprinklers from the valve.

“Main line” means the pressurized pipeline that delivers water from the water source to the valve or outlet.

“Maximum applied water allowance” means, for design purposes, the upper limit of annual applied water for the established landscaped area as specified in Section 8.88.040.B.2. It is based upon the area’s reference evapotranspiration, the ET adjustment factor, and the size of the landscaped area. The estimated applied water use shall not exceed the maximum applied water allowance.

“Mulch” means any material such as leaves, bark, straw or other materials left loose and applied to the soil surface for the beneficial purpose of reducing evaporation.

“Operating pressure” means the pressure at which a system of sprinklers is designed to operate, usually indicated at the base of a sprinkler.

“Overhead sprinkler irrigation systems” means those with high flow rates (pop-ups, impulse sprinklers, rotors, etc.).

“Overspray” means the water which is delivered beyond the landscaped area, wetting pavements, walks, structures or other nonlandscaped areas.

“Permit” means a building or development permit for a project which, as part of its scope, involves the installation of new landscaping or rehabilitating an existing landscape.

“Plant factor” means a factor that, when multiplied by reference evapotranspiration, estimates the amount of water used by plants. For purposes of this Chapter, the average plant factor of low water using plants ranges from 0 to 0.3, for average water using plants the range is 0.4 to 0.6, and for high water using plants the range is 0.7 to 1.0.

“Rain-sensing device” means a system which automatically shuts off the irrigation system when it rains.

“Record drawing” or “as-builts” means a set of reproducible drawings which shows significant changes in the work made during construction and which is usually based on drawings marked up in the field and other data furnished by the contractor.

“Recreational areas” means areas of active play or recreation such as sports fields, schoolyards, picnic grounds or other areas with intense foot traffic.

“Recycled water,” “reclaimed water” or “treated sewage effluent water” means treated or recycled wastewater of a quality suitable for nonpotable uses such as landscape irrigation; not intended for human consumption.

“Reference evapotranspiration” or ETo” means a standard measurement of environmental parameters which affect the water use of plants. ETo is given in inches per day, month, or year as represented in Section [8.88.060](#), and is an estimate of the evapotranspiration of a large field of four inches (4") to seven inches (7") tall, cool-season

grass that is well watered. Reference evapotranspiration is used as the basis of determining the maximum applied water allowances so that regional differences in climate can be accommodated.

“Rehabilitated landscape” means any relandscaping project that requires a permit.

“Runoff” means water which is not absorbed by the soil or landscape to which it is applied and flows from the area. For example, runoff may result from water that is applied at too great a rate (application rate exceeds infiltration rate) or when there is a severe slope.

“Soil moisture-sensing device” means a device that measures the amount of water in the soil.

“Soil texture” means the classification of soil based on the percentage of sand, silt and clay in the soil.

“Sprinkler head” means a device which sprays water through a nozzle.

“Static water pressure” means the pipeline or municipal water supply pressure when water is not flowing.

“Station” means an area served by one valve or by a set of valves that operate simultaneously.

“Turf” means a surface layer of earth containing mowed grass with its roots. Annual bluegrass, Kentucky bluegrass, Perennial ryegrass, Red fescue, and Tall fescue are cool-season grasses. Bermudagrass, Kikuyugrass, Seashore paspalum, St. Augustinegrass, Zoysiagrass and Buffalo grass are warm-season grasses.

“Valve” means a device used to control the flow of water in the irrigation system.

“Water conservation concept statement” means a one-page checklist and a narrative summary of the project as shown in Section 8.88.040.B.

8.88.040 Provisions for new or rehabilitated landscapes.

A. Landscape Documentation Package.

1. A copy of the landscape documentation package conforming to this Chapter shall be submitted to the City. No development or building permit shall be issued until the City reviews and approves the landscape documentation package.
2. A copy of the approved landscape documentation package shall be provided to the property owner or site manager along with the record drawings and any other information normally forwarded to the property owner or site manager.
3. A copy of the water conservation concept statement and the certificate of substantial completion shall be sent by the project manager to the City and to the local retail water purveyor, the Dublin San Ramon Services District, prior to the final sign-off of the permit by the City.

4. Each landscape documentation package shall include the following elements, which are described in Section 8.88.040.B:
 - a. Water conservation concept statement;
 - b. Calculation of the maximum applied water allowance;
 - c. Calculation of the estimated applied water use;
 - d. Calculation of the estimated total water use;
 - e. Landscape design plan;
 - f. Irrigation design plan;
 - g. Irrigation schedules;
 - h. Maintenance schedule;
 - i. Landscape irrigation audit schedule
 - j. Grading design plan;
 - k. Soil analysis (if applicable);
 - l. Certificate of substantial completion (to be submitted after installation of the project.)

B. Elements of Landscape Documentation Package.

1. Water Conservation Concept Statement. Each landscape documentation package shall include a cover sheet, referred to as the water conservation concept statement. The City will provide a sample statement. It shall serve as a checklist to verify that the elements of the landscape documentation package have been completed and have a narrative summary of the project.

2. The Maximum Applied Water Allowance.

- a. A project's maximum applied water allowance shall be calculated using the following formula:

MAWA = (ETO) (0.8) (LA) (0.62), where:

MAWA = maximum applied water allowance (gallons per year)

Eto = reference evapotranspiration (inches per year)

0.8 = ET adjustment factor

LA = landscaped area (square feet)

0.62 = conversion factor (to gallons per square foot)

b. Portions of landscaped areas in public and private projects such as parks, playgrounds, sports fields, golf courses or schoolyards where turf provides a playing surface or serves other recreational purposes are considered recreational areas and may require water in addition to the maximum applied water allowance. A statement shall be included with the landscape design plan, designating recreational areas to be used for such purposes and specifying any needed amount of additional water above the maximum applied water allowance.

3. Estimated Applied Water Use.

a. The estimated applied water use shall not exceed the maximum applied water allowance.

b. A calculation of the estimated applied water use shall be submitted with the landscape documentation package. It may be calculated by summing the amount of water recommended in the irrigation schedule.

4. Estimated Total Water Use. A calculation of the estimated total water use shall be submitted with the landscape documentation package. The estimated total water use may be calculated by summing the amount of water recommended in the irrigation schedule or calculate from the following formula;

The estimated total water use for the entire landscaped area equals the sum of the estimated water use of all hydrozones in that landscaped area.

$$\text{EWU (hydrozone)} = \frac{(\text{Eto}) (\text{PF}) (\text{HA}) (.62)}{(\text{IE})}$$

EWU (hydrozone) = estimated water use
(gallons per year)

Eto = reference evapotranspiration (inches
per year)

PF = plant factor

HA = hydrozone area (square feet)

(.62)= conversion factor

IE = irrigation efficiency

5. Landscape Design Plan. A landscape design plan meeting the following requirements shall be submitted as part of the landscape documentation package.

a. Plant Selection and Grouping.

1. Any plants may be used in the landscape, providing the estimated applied water use recommended does not exceed the maximum applied

water allowance and that the plants meet the specifications set forth in Sections 8.88.040.B.2 through 5 of this Chapter.

2. This Chapter adopts by reference the plants listed in Water Conserving Plants and Landscapes for the Bay Area, published by the East Bay Municipal Utility District, and for determining water usage, the plants listed in the WUCOLS PROJECT (Water Use Classification of Landscape Species) developed by the University of California Cooperative Extension.

3. Plants having similar water use shall be grouped together in distinct hydrozones.

4. Plants shall be selected appropriately based upon their adaptability to the climatic, geologic and topographical conditions of the site. Protection and preservation of native species and natural areas is encouraged. The planting of trees is encouraged wherever it is consistent with the other provisions of this Chapter.

5. Fire prevention needs shall be addressed in areas that are fire-prone. Information about fire-prone areas and appropriate landscaping for fire safety is available from the Alameda County Fire Authority or the California Department of Forestry.

b. Water Features.

1. Recirculating water shall be used for decorative water features.

2. Pool and spa covers are encouraged.

c. Landscape Design Plan Specifications. The landscape design plan shall be drawn on project base sheets at a scale that accurately and clearly identifies:

1. Designation of hydrozones;

2. Landscape materials, trees, shrubs, groundcover, turf and other vegetation. Planting symbols shall be clearly drawn and plants labeled by botanical name, common name, container size, spacing and quantities of each group of plants indicated;

3. Property lines and street names;

4. Streets, driveways, walkways and other paved areas;

5. Pools, ponds, water features, fences and retaining walls;

6. Existing and proposed buildings and structures including elevation view if applicable;

7. Natural features including but not limited to rock outcroppings, existing trees, shrubs that will remain;

8. Tree staking, plant installation, soil preparation details, and any other applicable planting and installation details;
9. A calculation of the total landscaped area in relation to the project site and a calculation of total turf area in relation to the landscaped area;
10. Designation of recreation areas.

6. Irrigation Design Plan. An irrigation design plan meeting the following conditions shall be submitted as part of the landscape documentation package.

a. Irrigation Design Criteria.

1. **Runoff and Overspray.** Soil types and infiltration rate shall be considered when designing irrigation systems. All irrigation systems shall be designed to avoid runoff, low head drainage, overspray or other similar conditions where water flows onto adjacent property, nonirrigated areas, walks, roadways or structures. Proper irrigation equipment and schedules, including features such as repeat cycles, shall be used to closely match application rates to infiltration rates, therefore minimizing runoff. Special attention shall be given to avoid runoff on slopes and to avoid overspray in planting areas with a width less than ten feet (10'), and in median strips. No overhead sprinkler irrigation systems shall be installed in median strips less than ten feet (10') wide

2. **Irrigation Efficiency.** For the purpose of determining the maximum applied water allowance, irrigation efficiency is assumed to be 0.625. Irrigation systems shall be designed, maintained and managed to meet or exceed 0.625 efficiency.

3. **Equipment.**

Water Meters: Separate landscape water meters shall be installed for all projects except for single-family homes.

Controllers: Automatic control systems shall be required for all irrigation systems and must be able to accommodate all aspects of the design.

Valves: Plants which require different amounts of water shall be irrigated by separate valves. If one valve is used for a given area, only plants with similar water use shall be used in that area. Anti-drain (check) valves shall be installed in strategic points to minimize or prevent low-head drainage.

Sprinkler Heads: Heads and emitters shall have consistent application rates within each control valve circuit. Sprinkler heads shall be selected for proper area coverage, application rate, operating pressure, adjustment capability and ease of maintenance.

Rain-Sensing Override Devices: Rain-sensing override devices are recommended for all irrigation systems.

Soil Moisture-Sensing Devices: It is recommended that soil moisture-sensing device be considered where appropriate.

b. Recycled Water.

1. The installation of recycled water irrigation systems (dual distribution systems) shall be required to allow for the current and future use of recycled water, unless a written exemption has been granted as described in Section 8.88.040.B.6.b.2 of this Chapter.

2. Irrigation systems shall make use of recycled water unless a written exemption has been granted by the District, stating that recycled water meeting all health standards is not available and will not be available in the foreseeable future for this particular site.

3. The recycled water irrigation systems shall be designed and operated in accordance with all local and state codes.

c. Irrigation Design Plan Specifications. Irrigation systems shall be designed to be consistent with hydrozones. The irrigation design plan shall be drawn on project base sheets. It shall be separate from, but use the same format as, the landscape design plan. The scale shall be the same as that used for the landscape design plan described in Section 8.88.040.B. The irrigation design shall accurately and clearly identify:

1. Location and size of separate water meters for the landscape, if applicable;

2. Location, type and size of all components of the irrigation system, including automatic controllers, main and lateral lines, valves, sprinkler heads, moisture-sensing devices, rain switches, quick couplers and backflow prevention devices;

3. Static water pressure at the point of connection to the public water supply;

4. Flow rate (gallons per minute), application rate (inches per hour) and design operating pressure (psi) for each station;

5. Recycled water irrigation systems as specified in Section 8.88.040.B.6.b.

7. Irrigation Schedules. Irrigation schedules satisfying the following conditions shall be submitted as part of the landscape documentation package.

a. An annual irrigation program with monthly irrigation schedules shall be required for the plant establishment period, for the established landscape, and for any temporarily irrigated areas.

b. The irrigation schedule shall:

1. Include run time (in minutes per cycle), suggested number of cycles per day, and frequency of irrigation for each station; and
 2. Provide the amount of applied water (in hundred cubic feet, gallons, or in whatever billing units the District uses) recommended on a monthly and annual basis.
- c. The total amount of water for the project shall include water designated in the estimated total water use calculation plus water needed for any water features, which shall be considered as a high water using hydrozone.
- d. Recreational areas designated in the landscape design plan shall be highlighted and the irrigation schedule shall indicate if any additional water is needed above the maximum applied water allowance because of high plant factors (but not due to irrigation inefficiency).
- e. Whenever possible, irrigation scheduling shall incorporate the use of evapotranspiration data such as those from the California Irrigation Management Information System (CIMIS) weather stations to apply the appropriate levels of water for different climates.
- f. Whenever possible, landscape irrigation shall be scheduled between nine p.m.(9:00 p.m.) and seven a.m. (7:00 a.m.) to avoid irrigating during times of high wind or high temperature.

8. Maintenance Schedules. A regular maintenance schedule satisfying the following conditions shall be submitted as part of the landscape documentation package:

- a. Landscapes shall be maintained to ensure water efficiency. A regular maintenance schedule shall include but not be limited to checking, adjusting and repairing irrigation equipment; resetting the automatic controller; aerating and dethatching turf areas; replenishing mulch; fertilizing; pruning, and weeding in all landscaped areas.
- b. Whenever possible, repair of irrigation equipment shall be done with the originally specified materials or their equivalents.

9. Landscape Irrigation Audit Schedules. A schedule of landscape irrigation audits, for all but single-family residences, satisfying the following conditions shall be submitted to the City as part of the landscape documentation package.

- a. At a minimum, audits shall be in accordance with the State of California Landscape Water Management Program as described in the Landscape Irrigation Auditor Handbook, the entire document, which is incorporated by reference. (See Landscape Irrigation Auditor Handbook (June 1990) version 5.5 (formerly Master Auditor Training), or as may be updated.)
- b. The schedule shall provide for landscape irrigation audits to be conducted by State-certified landscape irrigation auditors at least once every five (5) years

and submitted to the local water purveyor, the Dublin San Ramon Services District.

10. Grading Design Plan. Grading design plans satisfying the following conditions shall be submitted as part of the landscape documentation package.

- a. A grading design plan shall be drawn on project base sheets. It shall be separate from but use the same format as the landscape design plan.
- b. The grading design plan shall indicate finished configurations and elevations of the landscaped area, including the height of graded slopes, drainage patterns, pad elevations and finish grade.

11. Soils.

a. A soil analysis for projects with landscaping over twenty thousand (20,000) square feet satisfying conditions 1, 2 and 3 shall be prepared by a licensed soils lab or analyst and shall be submitted as part of the landscape documentation package.

1. Determination of soil texture, indicating the percentage of organic matter;
2. An approximate soil infiltration rate (either measured or derived from soil extra/infiltration rate tables). A range of infiltration rates shall be noted where appropriate;
3. Measure of pH, and total soluble salts.

b. For projects with landscaping under twenty thousand (20,000) square feet (unless a soils analysis has been undertaken), soil shall be amended using six (6) cubic yards of nitrified soil conditioner per one thousand (1,000) square feet incorporated into the top six inches (6") of soil.

c. A mulch of at least three inches (3") shall be applied to all planting areas except turf.

12. Certification.

a. Upon completing the installation of the landscaping and the irrigation system, an irrigation audit shall be conducted by a certified landscape irrigation auditor prior to the final field observation. (See Landscape Irrigation Auditor Handbook as referenced in Section 8.88.040.B.9).

b. A licensed landscape architect or contractor, certified irrigation designer, or other licensed or certified professional in a related field shall conduct a final field observation and, prior to occupancy of the building or establishment of use of property, shall provide a certificate of substantial completion to the City. The certificate shall specifically indicate that plants were installed as specified, that

the irrigation system was installed as designed, and that an irrigation audit has been performed, along with a list of any observed deficiencies.

- c. Certification shall be accomplished by completing a certificate of substantial completion and delivering it to the City, to the retail water supplier, and to the owner of record. The City will provide a sample certificate form.

C. Public Education.

1. **Publications.** Information about the efficient use of landscape water is available to water users throughout the community from the District.
2. **Model Homes.** At least one (1) model home that is landscaped in each project consisting of eight (8) or more homes shall demonstrate via signs and information the principles of water-efficient landscapes described in this Chapter.
 - a. Signs shall be used to identify the model as an example of a water-efficient landscape and featuring elements such as hydrozones, irrigation equipment and others which contribute to the overall water-efficient theme.
 - b. Information shall be provided by the project developer about designing, installing, and maintaining water-efficient landscapes.

8.88.050 Provisions for existing landscapes.

A. Water Management. All existing landscaped areas in the City that are one (1) acre or more, including golf courses, green belts, common areas, multifamily housing, businesses, parks, cemeteries and publicly owned landscapes shall perform a landscape irrigation audit at the property owner's request at least every five (5) years. At a minimum, the audit shall be in accordance with the California Landscape Water Management Program as described in the Landscape Irrigation Auditor Handbook, the entire document which is incorporated by reference. (See Landscape Irrigation Auditor Handbook, Department of Water Resources, Water Conservation Office (June 1990) version 5.5, or as may be updated.) Results shall be presented to the District for review. Recognition of projects that stay within the maximum applied water allowance is encouraged.

B. Water Waste Prevention. Water waste prevention shall fall under the authority of the District.

8.88.060 Reference evapotranspiration.

Reference evapotranspiration in inches (historical data, extrapolated from twelve (12) month normal year Eto maps and U.C. publication 21426) is as follows:

| County | City | Jan. | Feb. | Mar. | Apr. | May | Jun. | Jul. | Aug. | Sep. | Oct. | Nov. | Dec. | Anr E |
|---------|-----------|------|------|------|------|-----|------|------|------|------|------|------|------|----------|
| Alameda | Livermore | 1.2 | 1.5 | 2.9 | 4.4 | 5.9 | 6.6 | 7.4 | 6.4 | 5.3 | 3.2 | 1.5 | 0.9 | 47.2 |
| | Oakland | 1.5 | 1.5 | 2.8 | 3.9 | 5.1 | 5.3 | 6.0 | 5.5 | 4.8 | 3.1 | 1.4 | 0.9 | 41.8 |

This page of the Dublin Municipal Code is current through Ordinance 28-10, passed December 21, 2010.

Disclaimer: The City Clerk's Office has the official version of the Dublin Municipal Code. Users should contact the City Clerk's Office for ordinances passed subsequent to the ordinance cited above.

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